

*Intelligence, surveillance and reconnaissance technologies are growing more and more vital to U.S. campaigns in Afghanistan, Iraq and other potential trouble spots. Advanced instruments and new aircraft, including UAVs, are enabling warfighters to see farther, respond faster and strike with greater precision than ever before.*



# ISR in today's war:

## **U.S. and allied forces in Afghanistan are relying ever**

more heavily on intelligence, surveillance and reconnaissance (ISR) to thwart and defeat Taliban and Al Qaeda insurgents. ISR operations are at the core of the U.S. counterinsurgency strategy for stabilizing the country and making it inhospitable to terrorists, and will strongly influence whether that strategy ultimately succeeds or fails.

This viewpoint is widely shared by Pentagon officers and other officials with connections to the military campaign in Afghanistan. As they see it, ISR is the essential means of locating, identifying, tracking and targeting adversaries around the clock and in all kinds of

terrain. ISR also makes it possible to distinguish and isolate enemy combatants from civilian bystanders and attack them selectively.

Selective targeting has become all the more important in light of the restrictive rules of engagement that Gen. Stanley McChrystal, the top commander of U.S. and coalition forces, promulgated for his troops in 2009. Those rules are aimed at eliminating or greatly reducing civilian casualties from air strikes and ground fire, and thus at precluding postattack backlash reactions among the Afghan populace.

ISR is also seen as the first line of defense for U.S. and allied ground troops against

**by James W. Canan**  
Contributing writer



# A closer look

*An MQ-1 Predator, armed with AGM-114 Hellfire missiles, flies a combat mission over southern Afghanistan. (USAF photo/Lt. Col. Leslie Pratt.)*

deadly roadside bombs. The troops rely on timely information from ISR aircraft and other sources to detect insurgents in the act of emplacing those improvised explosive devices (IEDs). The IED threat is expected to worsen as the Obama administration's deployment of 30,000 additional troops to Afghanistan gains momentum in the coming months. This will make ISR an increasingly urgent priority, officials say.

Those who believe that the U.S. and its allies are unlikely to prevail in Afghanistan often cite the failure of Soviet forces there through the 1980s. But those forces suffered heavy losses of helicopters and other combat

aircraft shot down by shoulder-fired infrared missiles that the U.S. supplied the Afghan fighters of that era. Perhaps more to the point, military analysts note, the Soviets lacked the sophisticated counterinsurgency strategy of today's U.S. forces and the air and space surveillance and reconnaissance assets that make that strategy viable.

### **Renewed emphasis**

Late last year, well in advance of President Obama's decision to send 30,000 more U.S. troops to Afghanistan, the Pentagon began concentrating on stepping up its deployment and use of ISR assets there. Defense Secre-



*IEDs like these collected in Baghdad are an ever-increasing threat to ground troops in Afghanistan.*

tary Robert Gates noted in mid-November 2009 that “we’re pushing a lot into the theater...we’re moving as fast as we can. The Air Force has significantly expanded its [ISR] capability, and we intend to keep expanding it.”

Gates explained that the ISR expansion would involve not only airborne platforms such as manned MC-12 Liberty aircraft and unmanned MQ-1 Predators and MQ-9 Reapers, but also ground stations and their personnel, notably linguists and intelligence analysts. At the same time, Gates formed a multiservice ISR task force and set about reprogramming \$1.2 billion from other DOD projects to help pay for the escalation of ISR.

The secretary had been pressing the Air Force to deploy more UAVs for ISR in the Afghanistan/Pakistan theater. Air Force officials insist that the service had been building up its ISR assets and overhead intelligence-gathering capability all along, and that it is moving more Predators and Reapers into the theater as fast as it can.

Gen. Norton Schwartz, Air Force chief of staff, and Michael Donley, secretary of the Air Force, made ISR a blue-ribbon priority for the USAF. Schwartz observes that a major key to making a smaller Air Force even more effective is “persistent and pervasive ISR,” along with the precise air strikes that it fosters.

In accentuating ISR, the Air Force appointed Lt. Gen. David Deptula, a veteran fighter pilot, wing commander and planner, to the newly created post of deputy chief of staff for ISR. The service also unveiled its first-ever comprehensive ISR strategy, made sweeping changes in how it trains and uses operators of UAVs (which it prefers to call remotely piloted aircraft) and other ISR platforms, and set about improving its ISR capabilities across the board.

“The more ISR we provide, the more is

demand,” Deptula declares. “We may never fulfill the demand, but we are getting better and better at defining the [ISR] requirements and then matching them with our present capabilities. We are also beginning to look out to the future and wed technology advancements with emerging needs.”

### **Advanced capabilities**

Deptula observes that the advanced technologies of today’s aircraft, bombs, missiles, sensors and communications enable the Air Force to strike any target rapidly and precisely, anywhere on Earth, around the clock and in all kinds of weather. Now, he says, the biggest challenge for the Air Force lies not in finishing off targets, but in finding and pinpointing them by means of ISR.

It took only a few minutes of flight time for two USAF F-16 strike fighters to deliver the bombs that killed Abu Musab al-Zarqawi, the head of Al-Qaeda in Iraq, but 6,000 prior hours of Predator UAV flight time to track him and finally fix his position for the kill, Deptula notes. Those Predator hours are a classic example of “persistent ISR,” he says.

UAVs are uniquely capable of persistent ISR “in their ability to stay in position or maneuver over large areas for a long period of time—and that’s where a person in an aircraft becomes a limitation,” Deptula explains. UAVs “can operate in dangerous environments and can either watch or strike and...conduct undetected operations and penetrations,” he says.

Pentagon officials cite many examples of persistent ISR in Iraq that, they claim, demonstrate its vital importance in so-called irregular warfare against roving insurgents. ISR was the essence of Task Force ODIN (observe, detect, identify and neutralize), an aviation unit created during the Iraq war expressly to counter and check the rising toll from roadside bombs.

Military sources claim that ODIN, taking advantage of more numerous and increasingly

*The Air Force’s new manned intelligence, surveillance and reconnaissance platform, the MC-12, is designed to directly support ground forces with real-time ISR capability. (USAF photo/Senior Airman Tiffany Trojca.)*





*Schuyler Dunn replaces a part of the multispectral targeting system ball on an MQ-1B Predator at Ali Base, Iraq. (USAF photo/Tech. Sgt. Sabrina Johnson.)*

capable ISR assets, resulted in the capture or killing of more than 3,000 insurgents and a dramatic decrease in the number of coalition forces killed or wounded by IEDs. ODIN forces flew Warrior Alpha UAVs equipped with electrooptical and infrared sensors or with synthetic aperture radar, along with laser target markers, laser rangefinders and missiles, to detect and destroy IED emplacements.

ISR may be more challenging in the irregular warfare of Afghanistan than it was in Iraq, officials say. It must detect and track not only the tactical formations of enemy fighters and the movements of individual IED emplacements, for example, but also the foot traffic of roving Al-Qaeda insurgents inside the country and across the mountainous 1,500-mi. Afghanistan-Pakistan border, which is not conducive to infantry reconnaissance patrols.

To accomplish ISR all across the Afghanistan/Pakistan theater, U.S. and allied forces rely most heavily on manned and unmanned aircraft equipped with cameras, radars and infrared sensors. Those ISR platforms have direct communications links with rapid-reaction special forces on the ground, and with helicopters, artillery, strike fighters and unmanned aircraft armed with air-to-ground missiles.

Schwartz notes that the surveillance and targeting provided by the UAVs make strike aircraft and other types much more effective. "A UAV may tip a gunship, or tell a rescue helicopter crew where their pickup needs to occur, [and] these are the kinds of things that are happening all the time," he says.

### **Saving the day again and again**

ISR is credited with saving the day in Afghanistan on innumerable occasions. In one, a Predator spotted a substantial force of Taliban fighters moving into position to attack the U.S. air base at Kandahar, and notified the combined air operations center. The center quickly transferred control of the drone from Creech AFB in Nevada back to its launch-and-recovery crew near Kandahar. That crew contacted the Joint Terminal Attack Controller (JTAC), who guided Apache attack helicopters to the scene. The Apaches destroyed much of the Taliban force and prevented its planned attack on the air base.

In another operation, a Predator discovered a small band of insurgents emplacing a roadside bomb and communicated their position to the JTAC, who relayed it to an airborne B-1 bomber. The bomber attacked the insurgents, three of whom ran from the blast. The Predator tracked them, saw one drop by the way-side, and attacked the other two with its Hellfire missile. One was killed; the other rolled into a ditch. The Predator coordinated again with the JTAC, who guided an A-10 close-support aircraft to the scene to finish the job. The Predator loitered overhead "for a long period of time," to make sure that no Taliban fighter escaped, says an Air Force source.



*Task Force ODIN forces flew Warrior Alpha UAVs equipped with electrooptical and infrared sensors or with synthetic aperture radar, along with laser target markers, laser rangefinders and missiles.*

Deptula cites yet another successful operation in Afghanistan as an example of the timely and seamless distribution of communications in ISR at its best: The automated signals intelligence (SIGINT) suite in a high-altitude U-2 intercepted Taliban communications traffic and automatically transmitted it to Beale AFB, Calif. Traffic analysts there deduced considerable Taliban activity around Kandahar and immediately called the U-2 pilot back and told him what was happening. The pilot then alerted the U.S. JTAC on the ground, who relayed it to an Army combat unit in the vicinity, enabling that unit to thwart a Taliban ambush in the making.

The distribution of communications in that operation “took less than two minutes,” and exemplified the seamless nature of ISR, Deptula says. He notes that an Army unit may take its cue from data collected by a U-2 to request a follow-up video feed from a UAV, and then take action.

The unit may also direct the UAV to point out the target to a manned bomber, “and all this may have been planned in a forward operating post with imagery collected from a Global Hawk the day before.”

The Air Force ISR boss points out that ISR enables air and ground forces to distinguish among potential targets in order to avoid killing and wounding civilians while firing

on enemy combatants. “The issue is where and what we want to strike,” Deptula explains. “We might want to achieve a non-kinetic outcome.”

### Integration and analysis

ISR practitioners emphasize that networks of sensors are required to provide timely and comprehensive coverage, and that sensors operating singly are not usually adequate to the task. This, they say, is why U.S. and coalition forces in Afghanistan require a wholly integrated ISR architecture that embodies the full range of ISR assets (including space systems) and is capable of fulfilling diverse combat requirements.

Sensors on ISR aircraft include infrared imagers and cameras that provide air and ground commanders with still photos or full-motion videos. Rapid correlation and distribution of imagery is vital. Daniel Leaf, a Northrop Grumman vice

president and former three-star general in charge of Air Force requirements, observes that information gathered by ISR platforms represents “wasted effort if we can’t get it to the warfighters in usable form” via communications networks.

This is why the Air Force created its so-called “distributed common ground system” of ISR analysis centers in Korea, Germany, Ha-

*Information gathered by high-flying U-2s is sent to analysis centers, processed and returned to the theater.*



*Among the UAVs operated by ground troops are the 40-lb ScanEagle (right), the BATMAV and the RQ-11 Raven (facing page, top and bottom).*



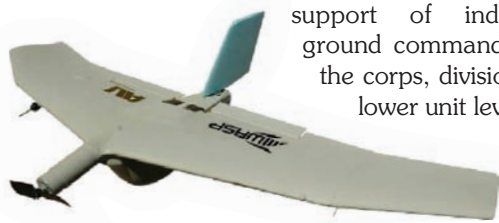
waii, California, and Virginia. The centers are manned by communications operators, linguists, analysts and maintenance personnel, among others, and serve as “the linchpins of our completely integrated [ISR] process,” Deptula explains.

“The information coming from a variety of platforms, including our Predators, Reapers, Global Hawks and U-2s, is sent to these analysis centers, processed, evaluated and transmitted right back into the theater for immediate use,” he says. “And the beauty of this system is that we don’t have to add more [ISR] people in Afghanistan as part of the [U.S.] surge there. What we do is shift workload among the five analysis centers; and we have the personnel to do that.”

### Proliferation of UAVs

According to the Air Force, Global Hawks operate at an altitude of 65,000 ft. They are equipped with electrooptical sensors, ground moving-target indicators, infrared sensors, synthetic aperture radar and a SIGINT suite. Reapers operate at 50,000 ft, twice as high as the lighter Predators. Both carry EO sensors for full-motion video, infrared sensors, SIGINT suites and laser target designators. Predators can be armed with Hellfire missiles, Reapers with Hellfires and various bombs.

In Afghanistan, as in Iraq, Air Force UAVs operate in support of the joint force commander at both the tactical and theater levels of operation. Army and Marine Corps UAVs operate in tactical support of individual ground commanders at the corps, division and lower unit levels.



*Soldiers in Kandahar depend on ISR input from myriad sources. (Photo by Tech. Sgt. Francisco V. Govea II.)*

More than 1,000 UAVs of assorted sizes and capabilities are said to be operating in the region. Michael Isherwood, a senior analyst at Northrop Grumman’s analysis center and a former Air Force colonel and command pilot in Iraq and Afghanistan, notes that the UAVs include more than 10 types of small, man-portable handheld systems operated by Army and Marine Corps companies and platoons, plus seven additional types controlled by battalion and brigade commanders.

Among the UAVs operated by ground troops are the 1-lb Battlefield Air Targeting Micro Air Vehicle (BATMAV) with forward- and side-looking cameras; the slightly larger, 4-lb, all-weather, all-hours, GPS-guided RQ-11 Raven with TV and IR sensors; and the 40-lb ScanEagle, with a turreted camera for both EO and IR reconnaissance at distances up to 5 mi. BATMAVs, also called Wasps, fly relatively short distances at low altitudes to provide over-the-hill and around-the-bend reconnaissance, and are operated by the Air Force as well.

In a recent position paper, the Army emphasized its “continuing expansion of persistent surveillance capability through both manned and unmanned systems,” including the Shadow UAV used by soldiers and Marines for reconnaissance, target acquisition and battlefield damage assessment. Shadows have seen heavy duty over Iraq and Afghanistan, providing surveillance and targeting support to brigade combat teams and battalions at distances out to 125 km.

Shadows complement the higher flying, longer loitering Sky Warrior, Hunter and Gnat UAVs that engage in surveillance and reconnaissance for corps and division commanders at ranges of hundreds of kilometers, the Army document explains. Warrior Alphas flown by the Army are almost identical to Air Force Predators, and are used, as in Task Force ODIN, for target acquisition, communications relay and counter-IED operations, as well as for surveillance and reconnaissance.



Aircrews performed a preflight check on an MQ-9 Reaper before it took off for a mission in Afghanistan on September 31. Reapers will be outfitted with "Gorgon Stare" pods. (Photo by Rinze Klein.)



The Joint Surveillance Target Attack Radar System crew from the 7th Expeditionary Air Combat and Control Squadron preflights an E-8C Joint STARS for a mission. (USAF photo/Staff Sgt. Aaron Allmon II.)

Near the end of 2009, as the U.S. troop buildup began in Afghanistan, Air Force officials confirmed reports of a new, stealthy ISR remotely piloted aircraft: the RQ-170 Sentinel, built by the Lockheed Skunk Works. Flown by operators at two Air Force facilities in Nevada (Creech AFB and the Tonopah Test Range), the Sentinel was test flown over Afghanistan but was not yet operational there, according to reports.

#### Sensor and communications advances

Deptula claims that advances in sensor technology have enabled the Air Force to enhance its ISR capability and capacity "throughout the [electromagnetic] spectrum," but that much more must be done. For example, he says, "we tend to focus on video because it is easy

to see and understand, but we have to increase our capabilities to rapidly revisit locations, provide still imagery and collect signals intelligence and human intelligence."

Airborne radar and communications intercept platforms are considered vital elements of the overall ISR architecture. For example, the Air Force E-8C Joint Surveillance Target Attack Radar System (J STARS) aircraft, while conducting wide area radar surveillance, can alert a Predator or a Hunter (Army UAV) to take a closer look at something suspicious that it detects from afar. The Air Force RC-135 Rivet Joint aircraft, operating at 30,000 ft, can pick up communications traffic 240 mi. away. Global Hawks and U-2s, operating at 60,000 ft or higher, can detect signals out to 300 mi.

The Air Force will expand its capacity for wide-area surveillance by equipping Reaper UAVs with new "Gorgon Stare" pods. Their deployment is scheduled to begin in April.

"They will be able to see the same distance as the video sensors now onboard the Reapers, and they will be able to do it not just through a little soda-straw area but all across an area of 4x4 km," Deptula explains. "They will be able to provide video from 10 different images anywhere in that area to 10 different people on the ground."

The pods weigh 1,000 lb each, which makes them too heavy for the Predators, but not the larger Reapers, to carry. Deptula calls them "one of the biggest things" now coming into play in Afghanistan ISR. "The quickest way we can introduce additional ISR capacity is not to build additional platforms but to increase the capability of the platforms we already have," he declares.

Deptula calls ISR "extremely important" to the successful outcome of the U.S. strategy and operations in Afghanistan and environs. Could ISR make the difference between success and failure?

"Absolutely," he replies. **A**